http://dx.doi.org/10.1016/j.krcp.2012.04.604

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RESOLUTION OF SYMPTOMATIC IMMOBILIZATION HYPERCALCEMIA (IH) AFTER REHABILITATION EXERCISES IN A HEMODIALYSIS PATIENT

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The patient is a 76-year-old Korean female who had been thrice-weekly hemodialysis for 3 months for ESRD attributable to diabetic nephropathy. She presented to emergency room with decreased mentality. Before admission, she had been bed-ridden status for 4 months due to poor general condition. Brain CT and MRI showed negative findings. Serum calcium was 15.6 mg/dl, ionized calcium 2.12 mmol/L, hypercalciuria (FECa 26.2%), and low serum levels of iPTH (42.92 pg/ml) suggested non-parathyroidal hypercalcemia. Two weeks ago, her serum calcium and phosphate level was 9.0 and 6.1 mg/dl, respectively and she was receiving calcium acetate. An extensive workup failed to identify any etiology of hypercalcemia. Hypercalcemia was temporarily ameliorated after withdrawal calcium-containing phosphate binder and daily hemodialysis with low calcium (Ca^{++} 1.25 mmol/L) dialysate but recurred one week later. Serum calcium level was increased and reached to 12.2–13.5 mg/dl. Immobilization hypercalcemia was considered after the exclusion of other discernible causes. We decided to try rehabilitation exercises. Two weeks after passive range of motion (ROM) exercise of joints and tilting table standing, serum calcium level was decreased to below 10.5 mg/dl.

http://dx.doi.org/10.1016/j.krcp.2012.04.605

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IMPACTS ON PROTEIN INTAKE IN PERITONEAL DIALYSIS PATIENTS

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The purpose of this study is to identify barriers related to achieving an adequate protein intake, and predictors of protein-energy wasting (PEW) in Peritoneal Dialysis (PD) patients.

This is a prospective observational study of prevalent patients receiving PD in our facility. Data collection occurs at baseline and six months, including renal-related morbidity, biochemistry, weight, nutritional status (Subjective Global Assessment (SGA) and PEW criteria), energy and protein intake (via diet history), social situation and support, appetite and quality of life (EQ-5D). The following is a preliminary analysis of baseline characteristics, using chi-square, Fisher's exact test and t-test, against protein intake less than or greater than the recommended 1.2 g/kg adjusted body weight (ABW).

To date, 43 patients have been recruited, 56% ($n=24$) are male, with mean (SD) age 61 (12.3) years and BMI 28.5 (7.3) kg/m^2. Of these, 16% ($n=7$) were assessed as malnourished (SGA B or C) and 93% ($n=40$) met one or more PEW criteria. Sixty percent ($n=26$) failed to meet minimum protein requirements 1.2 g protein/kg ABW (mean 1.08 (0.3) g protein/kg ABW). Inadequate protein intake was related to reliance on social security ($p=0.05$), having a diminished appetite ($p=0.05$) and lower reported quality of life (health utility index) ($p=0.03$). PEW was related to decreased mobility ($p=0.05$), difficulties with self care ($p=0.001$) and presence of pain/discomfort ($p=0.01$).

In conclusion, inadequate protein intake was present in a significant portion of the population. Barriers to adequate intake in this population can include low income and appetite levels, which may concomitantly impact on quality of life. Further work on recruiting participants and longitudinal follow-up is currently underway to elucidate the impact of this on patient outcomes.

http://dx.doi.org/10.1016/j.krcp.2012.04.606

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EFFECT OF HIGH SALT ON RENAL NKCC2 IN *CYP4F2* TRANSGENIC MICE

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Cytochrome P450 4F2 (CYP4F2) catalyzes the ω-hydroxylation of arachidonic acid (AA) to 20-HETE. We previously generated a *CYP4F2* transgenic (TG) mouse model, and demonstrated that overexpressed CYP4F2 elevates 20-HETE production and blood pressure in the TG mice, indicating 20-HETE plays a prohypertensive role *via* vasoconstriction in *CYP4F2* TG mice. To investigate antihypertensive action of 20-HETE *via* natriuresis in *CYP4F2* TG mice , we fed TG mice a high salt (4% NaCl) diet for 2 weeks, and measured their systolic blood pressure (SBP), urine sodium concentration, urine volume, and urinary 20-HETE excretion. The expression of renal Na^+-K^+-$2Cl^-$ cotransporter, isoform 2 (NKCC2) was detected by Real-time PCR and Western blot. The results showed that SBP was not changed, but the urinary sodium excretion and urinary 20-HETE excretion were promoted by high salt intake in TG mice. NKCC2 protein was reduced by high salt intake, but its mRNA was not. These data suggest that 20-HETE of *CYP4F2* TG mice exert natriuresis in renal adaptation to elevated Na^+ intake, in which reduction of renal NKCC2 protein was involved through high salt-induced posttranscriptional regulation.

http://dx.doi.org/10.1016/j.krcp.2012.04.607

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INNATE IMMUNITY AND CKD PROGRESSION

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Background: Alterations in innate immunity play a role in renal damage in experimental models but the role of these alterations in the progression of CKD in humans is still poorly defined. Procalcitonin (PCT), is a biomarker of innate immunity produced by C-cells of the thyroid and by the adipose tissue.
Objectives: We measured serum plasma PCT levels in a cohort of 670 patients with stage 3–5 CKD and tested the relationship between this biomarker metrics of adiposity, proteinuria, GFR and progression to kidney failure over a 3 year follow-up. None of the patients had intercurrent infectious or acute inflammatory processes.
Methods: PCT was measured by an ultrasensitive immunoluminometric assay. The GFR was estimated by a Cystatin-C based equation. The relationship between PCT and renal events was tested by multivariate Cox's regression and interaction analysis.
Results: Procalcitonin exceeded the upper limit of the normal range (> 0.064 ng/mL) in 492 patients (67 %) while the corresponding figure for high sensitivity CRP (> 1 mg/L) was 170 (%). PCT was higher ($P<0.001$) in males and strongly associated with the GFR ($r=$) as well as diabetes ($P=0.004$) and a history of cardiovascular (CV) events ($P=0.007$). Furthermore PCT was inversely related with Hb ($r=-0.16$, $P<0.001$) and with serum albumin ($r=-0.10$, $P=0.009$) and directly associated with CRP ($r=0.23$, $P<0.001$) and with white blood cells count ($r=0.12$, $P=0.002$). Of note, PCT was higher ($P<0.001$) in patients with large waist hip ratio (IVth quartile) than in those normal or high normal WHR (1st to 3rd quartiles).

During the follow up, PCT predicted the combined renal end-point (30% GFR loss, dialysis or transplantation) (HR for 1 ng/ml increase: 2.37, 95%CI:1.25–4.48, $P=0.009$) in a model adjusting for age, sex, diabetes, BP, smoking, cholesterol, background cardiovascular events and PCT interacted with baseline GFR in predicting renal outcomes. Indeed the risk of for the combined end-point was minimal in patients with low PCT and high GFR and maximal in those with low GFR and high PCT.
Conclusions: Plasma procalcitonin is a more sensitive biomarker of innate immunity than CRP in CKD patients and in part reflects excessive adiposity. High PCT in CKD patients predicts progression toward kidney failure. These results are compatible with the hypothesis that alterations in innate immunity play a role in the progression of CKD in humans.

http://dx.doi.org/10.1016/j.krcp.2012.04.608

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EFFECTS OF OMEGA-3 AND PROTEIN SUPPLEMENTATION ON NUTRITIONAL AND INFLAMMATORY INDICES IN HEMODIALYSIS PATIENTS – A PILOT STUDY.

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Intervention to correct malnutrition and chronic inflammation in dialysis patients is often impeded by poor compliance due to medical and